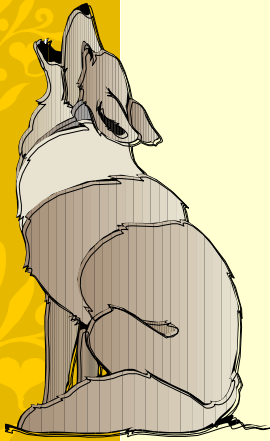




## *Strengthening El Niño Offers Some Hope for a Wetter Winter*

*Erik Pytlak, Science and Operations Officer*



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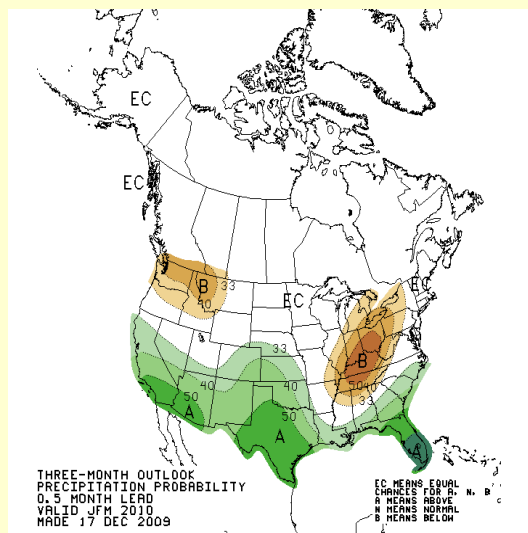
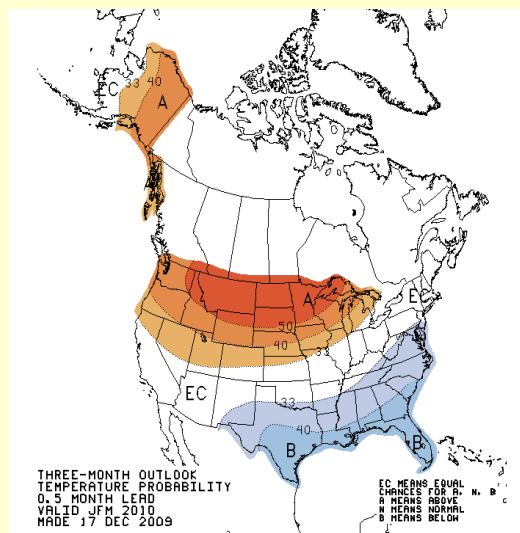
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Since about mid July, a weak El Niño has been underway, but more recently moderate El Niño conditions have been observed. Simply put, an El Niño is an unusual warming of water temperatures over the tropical Pacific Ocean, which occurs about once every three to five years. When these ocean waters are warmer than usual, they fuel more thunderstorms over larger stretches of the tropical Pacific, which in turn feeds energy and moisture into the upper levels of the atmosphere. Eventually, this can cause major changes in the jet stream pattern across the entire globe. If an El Niño is strong enough and persists into the winter, it causes the jet stream to frequently split over the Pacific, with the northern branch aiming at western Canada, and the southern branch aiming at the southern U.S. This southern branch, better known as the subtropical jet, then directs both storm systems and rich tropical moisture toward the southern U.S., including Arizona, which can lead to a wet and rather cool winter. In September and October the El Niño, which seemed to play a significant role in weakening the monsoon pattern in August and September,

remained fairly steady in the “weak” category with average water temperatures about 1°C above average. However, since just before Halloween, water temperatures have begun to climb again. Most recently the El Niño has strengthened to the “moderate” category, and could become the strongest El Niño since 1997-98.

We have to be cautious with moderate El Niño events, though, because while they do increase the chance of above average winter precipitation, especially in southern Arizona, it is not a slam dunk. For example, in our last moderate El Niño in 2002-03, pre-existing drought conditions grew much worse as the El Niño weakened unusually early in the winter. Thus Arizona did not receive the beneficial rains it was expecting. Instead, the 2003 fire season became one of the worst on record, which included the Aspen Fire which ravaged Mt. Lemmon.

While recent trends are increasing our confidence in a wetter winter, this El Niño is very likely to be weaker than the notorious 1997-98 event, when near record snowpacks were observed in the mountains of Southeast Arizona.



The above depiction of temperatures during January through March calls for equal chances of above or below normal temperatures during the period. The depiction of precipitation suggest enhanced probabilities of above normal precipitation.



## CoCoRaHS

### Community Collaborative Rain, Hail & Snow Network

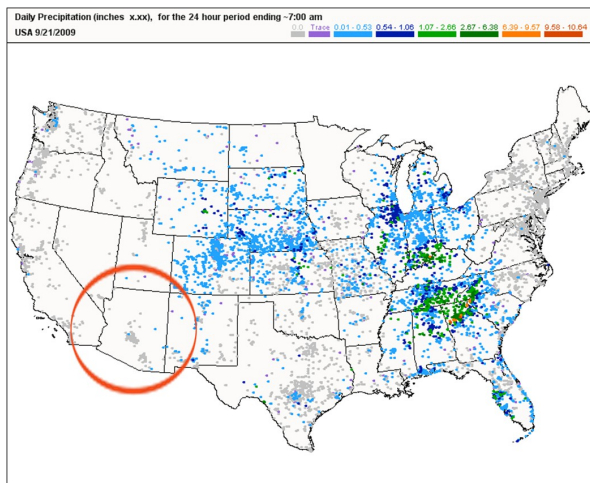
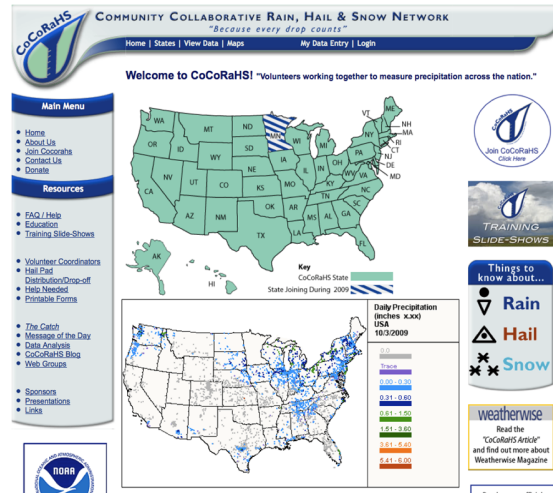
*"Because every drop counts"*



#### What is CoCoRaHS

CoCoRaHS (the **Community Collaborative Rain, Hail and Snow Network**) is now active in Arizona! We need you to help us measure the precipitation throughout the state, "Because every drop counts", particularly in our desert state. If the nearest official gauge doesn't match the amount you get at your house, here's your chance to let us know how much rain, hail or snow you measured. This effort is supported by the State Climate Office for Arizona and the National Weather Service.

If you already participate in another observation network, such as Rainlog, and you have a 4" manual plastic rain gauge, we welcome your observations and encourage you to participate in both networks. Many CoCoRaHS observers across the country participate in multiple networks. It just takes just a few more minutes to enter your data into the CoCoRaHS system (online).

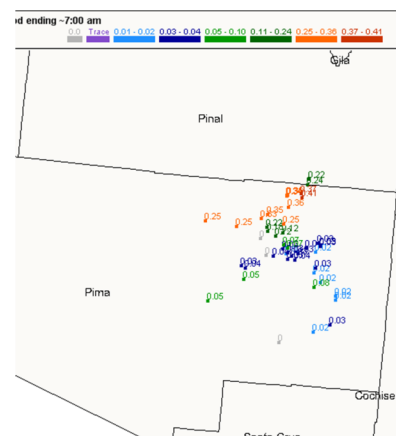


#### What if I am already a NWS Storm Spotter?

We are encouraging our NWS Storm Spotters that participate in our RainNet, to use CoCoRaHS as a method to report their daily precipitation. If you do not have access to the internet, you are still more than welcome to call us with your precipitation totals. Also included in CoCoRaHS is a way to enter short term intense precipitation and hail which will immediately be sent to our local office to aid in the issuing and updating of warnings. If you are not a part of our RainNet but would like to start reporting daily precipitation, we invite you to consider joining CoCoRaHS!

#### What will our volunteer observers be doing?

Each time a rain, hail or snow storm crosses your area, volunteers take measurements of precipitation from as many locations as possible. These precipitation reports are then recorded on the Web site **www.cocorahs.org**. The data are then displayed and organized for many of our end users to analyze and apply to daily situations ranging from water resource analysis and severe storm warnings to neighbors comparing how much rain fell in their backyards.



### Who uses CoCoRaHS?

CoCoRaHS is used by a wide variety of organizations and individuals. The National Weather Service, other meteorologists, hydrologists, emergency managers, city utilities (water supply, water conservation, storm water), insurance adjusters, USDA, engineers, mosquito control, ranchers and farmers, outdoor & recreation interests, teachers, students, and neighbors in the community are just some examples of those who visit our Web site and use our data.



### What do we hope to accomplish?

1. Provide accurate high-quality precipitation data for our many end users on a timely basis.
2. Increasing the density of precipitation data available throughout the country by encouraging volunteer weather observing.
3. Encouraging citizens to have fun participating in meteorological science and heightening their awareness about weather.
4. Providing enrichment activities in water and weather resources for teachers, educators and the community at large to name a few.

### What equipment do I need to volunteer?

The only items that you would need to provide yourself are a 4" diameter rain gauge, internet access and an interest in weather. If you have an interest in hail, we can provide you with a hail pad.



We will also provide you with the necessary training. There are training presentations available online at [www.cocorahs.org](http://www.cocorahs.org) that you can review at your leisure, as well as occasional local instructor led training.



### What benefits are there in volunteering?

One of the neat things about participating in this network is coming away with the feeling that you have made an important contribution that helps others. By providing your daily observation, you help to fill in a piece of the weather puzzle that affects many across your area in one way or another. You also will have the chance to make some new friends as you do something important and learn some new things along the way.



# Questions?

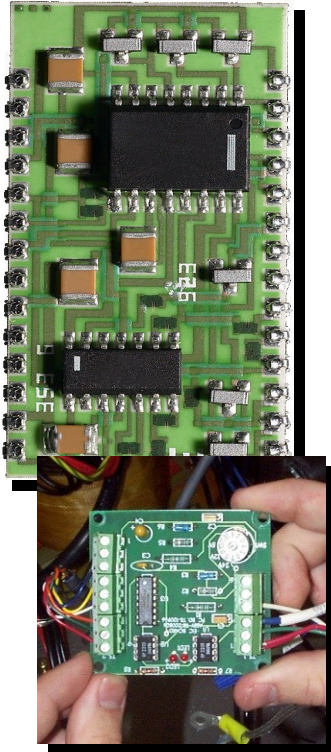
For additional information please visit [www.cocorahs.org](http://www.cocorahs.org) or you may contact the CoCoRaHS Southeast Arizona Coordinators:

**Glenn Lader** ([glenn.e.lader@noaa.gov](mailto:glenn.e.lader@noaa.gov)) or **Chad Kahler** ([chad.kahler@noaa.gov](mailto:chad.kahler@noaa.gov))



## *An Introduction to the Electronics Personnel*

*Greg Mollere, Senior Forecaster*



I was in the military for over 11 years, and as a soldier I was stationed in many countries. I have been deployed to Asia and Europe where I met and married my wife. I got out of the Army in Nov. of 2001 at Ft. Huachuca, AZ, and from there I went to work for Tobyhanna Army Depot in South Korea where we lived for almost five years. After that I was able to secure a job with the NWS in Glasgow, MT as an ET. Later I got an assignment to work for the Burlington, VT WFO, where as part of the team of ET's we did some cutting edge projects such as the first NWS VoIP (Voice Over Internet Protocol) phone system as well as

During the past year and a half, two of our three electronics staff have retired. Electronics Technician Norm Phelps retired at the end of '08 after 34 years of service, and Jim Schmidt, Electronics System Analyst retired in August of '08 after 37 years of service. Two recent additions to the staff to replace Norm and Jim are Dennis Baron, Electronics Systems Analyst, and Terry Bohannon, Electronics Technician. Joe Lockridge arrived in late 2006 to replace Kris Johnson who left us in

June 2006 when he was promoted to the ESA position in Seattle, WA. So in a little over three years our entire Electronics staff has changed.

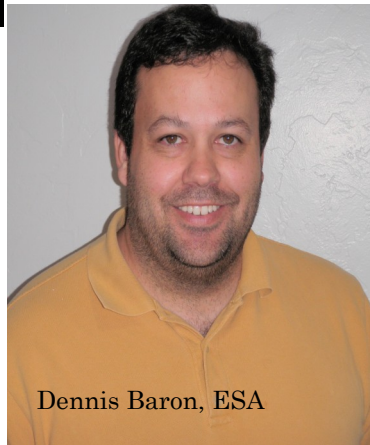
Our Electronics staff are a vital and important part of the forecasting process. There are many electronics systems that have to be maintained and running in tip-top shape in order for our forecast and warnings to be the best that they can be.

The systems that have to be maintained and

repaired are the Doppler Radar, ASOS (Automated Surface Observing System), Upper-Air Observing System, NOAA Weather Radio, not to mention all of the office computers.

The ET's are always at work either repairing a system, or taking precautionary steps to insure that a system will perform as required during inclement and/or severe weather.

Below are photos of the ET's and a brief description about themselves.



Dennis Baron, ESA



Joe Lockridge

Photo  
of  
Terry Bohannon  
Not  
Available

installed the first hydrogen fuel cell to serve as a backup power on a NOAA Weather Radio in upstate New York. With most of my family still living in AZ, I was always hopeful that I could return here someday. When the position for the ESA became available, I took the opportunity and was selected for the job. Some of my hobbies include hunting, fishing, hiking and traveling the world with my wife and son.

I was born in Oceanside, CA and raised in a military family. I dropped out of High School in the 9<sup>th</sup> grade and earned my GED. Then I spent 8 years in the USAF fixing Avionics systems on cargo aircraft. Later I tracked weather satellites for NESDIS at Wallops Island, VA before moving to Tucson to work for the National Weather Service.

I have been with the National Weather Service as an Electronics Technician for almost 6 years. I also served for 11 years in the US Air Force as a technician repairing communications equipment. I have spent several years in overseas assignments and really enjoy travel and new cultures. I have many hobbies like astronomy, feeding stray cats, and exploring nature.

## *The Automated Surface Observing System (ASOS)*

*Terry Bohannon, Electronics Technician*

The ASOS serves as the nation's primary surface weather observing network. It is designed to support weather forecast activities and aviation operations. The ASOS was especially designed for the safety of the aviation community, so the sensors are usually located near airport runways. The weather data is essential for safe and efficient aviation operations. The ASOS observations provide meteorological data, which is required to define the climate of the United States and to help measure long-term climate changes. The weather observations also provide current data to support forecast, warning and other public service programs of the NWS.

The ASOS automatically records the current weather data and transmits routine hourly observations, and may transmit special observations when unusual weather conditions occur. The basic weather elements observed are: sky condition, visibility, present weather, obstructions to vision, pressure, temperature, dew point, wind direction and speed, precipitation accumulation, and selected significant remarks. The weather data is coded and then combined into a METAR. Before the hourly METAR is transmitted, the weather conditions are evaluated at the site to ensure accuracy of the data. The only weather condition that cannot be directly measured is atmospheric pressure. Accuracy

of atmospheric pressure is vital, since it provides the data to establish the elevation of the aircraft above the ground. At airports with a tower, three separate and independent pressure sensors are used to measure air pressure. At smaller airports without a tower, two pressure sensors are used. The accuracy of the pressure sensors are monitored constantly to ensure that the pressure measurements match. The pressure sensors are also checked routinely for accuracy with an independent calibrated pressure sensor.

Quality control of the nation's ASOS system is provided by the ASOS Operations and Monitoring Center (AOMC). The AOMC is staffed 24 hours a day and constantly monitors the ASOS system, when an equipment malfunction occurs, the local NWS Electronic Technician is quickly alerted to repair the problem.

Due to the operating costs

associated with ASOS, the stations are widely spaced. Before the ASOS, the Cooperative Observer Program (COOP) was the main source of daily weather information. This network of mostly volunteer weather observers still flourishes today, providing much of the meteorological and climatological data to the country.

Description of the ASOS sensors in the picture;

Starting at the left, precipitation accumulation sensor, temperature and dew point sensor, present weather sensor, in the middle is the tilt-down tower with the wind sensor and safety lights on top, in front of the tower is the cabinet containing the sensor data control equipment, on the right side is the cloud height indicator, and the visibility sensor.

Additional equipment may be installed at some locations, like a lightning detector or a freezing rain indicator.



*THE ASOS WAS  
ESPECIALLY  
DESIGNED FOR  
THE SAFETY OF  
THE AVIATION  
COMMUNITY, SO  
THE SENSORS ARE  
USUALLY  
LOCATED NEAR  
AIRPORT  
RUNWAYS.*





"THE NATIONAL  
WEATHER SERVICE  
OFFICE IN TUCSON  
ARIZONA HOSTED  
AN AWARDS  
CEREMONY TO  
HONOR  
COOPERATIVE  
WEATHER  
OBSERVERS FROM  
SOUTHEAST  
ARIZONA FOR  
THEIR DEDICATED  
SERVICE TO THE  
NATIONAL  
WEATHER SERVICE  
CLIMATE  
NETWORK."

## National Weather Service in Tucson Honor Cooperative Weather Observers

Ken Drozd, Warning Coordination Meteorologist

On Saturday October 24, 2009, the National Weather Service office in Tucson Arizona hosted an awards ceremony to honor cooperative weather observers from southeast Arizona for their dedicated service to the National Weather Service Climate Network.

Meteorologist in Charge Glen Sampson and Observations Program

Leader Mic Sherwood, both of NWS Tucson, and Data and Observing Systems Program Manager Susan Nelson from NWS Western Region Headquarters presented several length of service awards during the ceremony. In addition, the Helmut E. Landsberg Award was presented to Pat King to commemorate 60 years of service by the King Family, who have provided

weather observations from Anvil Ranch, about 60 miles southwest of Tucson.

After the ceremony, the honorees and their families were given a tour of the NWS office. Science and Operations Officer Erik Pytlak demonstrated the capabilities of AWIPS and conducted a map discussion which highlighted the weather forecast for the upcoming week.

*The following table shows the length of service awards (not everyone was present at the ceremony).*

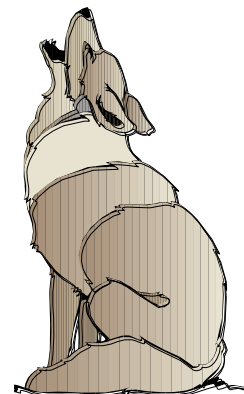
60+ years of service ( <u>Landsberg Award</u> )	The King Family
	The Winkler Family
40 years of service	The Sanders Family
35 years of service	Wylie Boyd
30 years of service	George Proctor
	William McKay
	Joe Meahl
25 years of service,	
Honored Institution Award	Sierra Vista Fire Dept.
	City of Kearny
20 years of service	Dick & Betty Youse
	Ray Comacho
	Rose Van De Yacht
	Margaret & Robert Farrell
	William McKay Jr.
15 years of service	Jim Andrew
	Jesus Saltido
	Don Garate
	The Culling Family
10 years of service	Steve Ronquillo, Austin Sanders,
	Lois & Bob Miller, Steve & Michael Beller, Gerardo Federico, Frank Ayala, Wendy Kirkpatrick, Clyde Hall, Cyrus Jones, Montoya Family, Xavier Montoya





## National Weather Service in Tucson Honor Cooperative Weather Observers

Ken Drozd, Warning Coordination Meteorologist



GLEN SAMPSON, HELMUT E. LANDSBERG AWARD RECIPIENT PAT KING (ANVIL RANCH) AND SUSAN NELSON (PHOTO BY MIC SHERWOOD)



GLEN SAMPSON, FRAN & GEORGE R. PROCTOR (PATAGONIA #2) & SUSAN NELSON (PHOTO BY MIC SHERWOOD)



GLEN SAMPSON, JOE MEAHL (ELOY) AND SUSAN NELSON (PHOTO BY MIC SHERWOOD)



SUSAN NELSON, ROSE VAN DE YACHT (PEARCE-SUNSHINES) AND GLEN SAMPSON (PHOTO BY MIC SHERWOOD)



SUSAN NELSON, JIM ANDREW OF ARIZONA ELECTRIC POWER COOP, INC. (COCHISE 4 SSE) & GLEN SAMPSON (PHOTO BY MIC SHERWOOD)



SUSAN NELSON, LOIS AND BOB MILLER (Y LIGHTNING RANCH) AND GLEN SAMPSON (PHOTO BY MIC SHERWOOD)

*"THE HELMUT E. LANDSBERG AWARD WAS PRESENTED TO PAT KING TO COMMEMORATE 60 YEARS OF SERVICE BY THE KING FAMILY. THE WINKLER FAMILY WAS ALSO AWARDED."*

Please keep your personal information up-to-date. Do we have your correct mailing address, location, phone number and e-mail address? If not, please update us so that our database is as current as possible. The best way to update your information is by e-mail, or to call and speak with Greg Mollere. Thanks!

GREG.MOLLERE@NOAA.GOV

## 2009 Climate Report for Tucson, Arizona

*John Glueck, Senior Forecaster & Climate Focal Point*

**2009 Headlines**  
**2nd Warmest year on record**  
**4th driest year on record**

**Decade of 2000's Headlines**  
**Warmest decade on record**  
**Driest Decade on record**

Tucson residents endured another very warm and dry year during 2009. In the Pacific, 2009 started off with neutral ENSO conditions but El Niño started to develop during the spring and by the end of the year it had strengthened to moderate status. The developing El Niño did affect the summer thunderstorm season with the monsoon basically being a no-show. The area started off the year with no short term drought conditions but due to one of the driest years on record, the area was classified as being in a severe drought by the end of the year.

### Temperature Data for 2009

The average yearly temperature of 71.2 degrees was 2.5 degrees above normal and ranks as the 2nd warmest year on record. This is two-tenths of a degree shy of the warmest year on record which occurred in 1989 (71.4 deg). This marks the 11th straight year of above normal temperatures. In fact, dating back to 1984 only one year (1998, 68.1 degs.) has been below normal.

#### Top 5 warmest years on record for Tucson



Rank	Average Yearly Temp	Year
1	71.4 Degs.	1989
2	71.2 Degs.	<b>2009</b>
3	71.0 Degs.	1994
4	70.8 Degs.	2005
5	70.7 Degs.	2003



The average yearly high temperature for 2009 of 85.1 degrees was 2.6 degrees above normal. This ranks as the 5th warmest average yearly high temperature on record (tied with 1934). The average yearly low temperature for 2009 of 57.3 degrees was 2.5 degrees above normal and ranks as the 2nd warmest average yearly low temperature on record.

#### Top 5 warmest average yearly high temperatures on record for Tucson

Rank	Average Yearly High Temp	Year
1	86.9 Degs.	1989
2	85.8 Degs.	1910
3 Tie	85.5 Degs.	1988
	85.5 Degs.	1994
5 Tie	85.1 Degs.	<b>2009</b>
	85.1 Degs.	1934

#### Top 5 warmest average yearly low temperatures on record for Tucson

Rank	Average Yearly Low Temp	Year
1	57.5 Degs.	2005
2	57.3 Degs.	<b>2009</b>
3	57.0 Degs.	2003
4	56.9 Degs.	2007
5	56.8 Degs.	1977



## 2009 Climate Report for Tucson, Arizona

John Glueck, Senior Forecaster & Climate Focal Point

### Rainfall Data for 2009

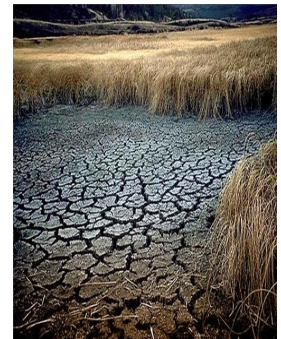
Rainfall across the metro area was highly varied with the airport, the official recording location for Tucson, one of the driest in the area. The airport recorded 5.67 inches which ranks as the 4th driest year on record.

The 2009 Monsoon, by all accounts, was a huge disappointment and can be attributed in part by the development of El Niño in the Pacific. The rainfall total at the airport of 2.86 inches goes into the record books as the 11th driest Monsoon on record. Rainfall amounts across the metro area ranged from two to five inches with some higher amounts up to 7 inches being recorded on the northwest side, mainly north of Ina Road and west of Oracle Road (State Highway 77). It was another warm Monsoon with an average temperature of 87.1 degrees which ranks as the 3rd warmest Monsoon on record. The top two warmest Monsoons occurred in 1994 (88.7 degrees) and 1989 (87.3 degrees).

Top 5 driest years on record for Tucson



Rank	Rainfall	Year
1	5.07 inches	1924
2	5.34 inches	1953
3	5.53 inches	1947
4	5.67 inches	<b>2009</b>
5	6.28 inches	1976

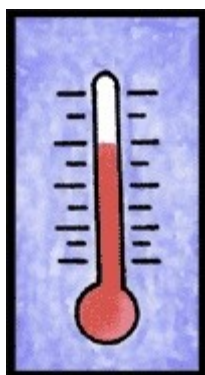
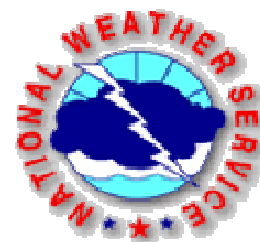


## National Weather Service Mission:

*“The National Weather Service (NWS) provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products from a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public and the global community.”*



NATIONAL WEATHER SERVICE  
520 N. PARK AVE. , SUITE #304  
TUCSON, ARIZONA 85719  
PHONE: (520) 670-5156  
FAX: (520) 670-5167



### What you should report?

- Tornado:** A tornado or a funnel cloud
- Heavy Rain:** A **half an inch or more** in less than an hour
- Hail:** **Dime size hail** (1/2 inch) or larger
- High Wind:** Estimated or measured **45 mph or greater**
- Flooding:** **Any** kind of flooding
- Snow:** **One inch** or more (2 inches if above 5000 ft.)
- Visibility:** **Less than one mile**
- Death/Injury:** **Any** weather-related reason
- Damage:** **Any** weather-related reason

**(520) 670-5162 or 1-800-238-3747**



## National Weather Service Tucson Office Staff

**Meteorologist in Charge.....Glen Sampson**

**Administrative Support Assistant.....Krist'I Palacio**

**Warning Coordination Meteorologist.....Kenneth Drozd**

**Science and Operations Officer.....Erik Pytlak**

**Service Hydrologist.....Chad Kahler**

**Electronic Systems Analyst.....Dennis Baron**

**IT Specialist.....Evelyn Bersack**

**Electronic Technicians.....Terry Bohannon, Joseph Lockridge**

**Senior Forecasters.....Jeff Davis, Brian Francis, John Glueck, Jim Meyer, Greg Mollere**

**General Forecasters.....Glenn Lader, Chris Rasmussen, Steve Reedy, Craig Shoemaker, Gary Zell**

**Meteorologist Interns.....Bill Turner, Scott Minnick**

**Observation Program Leader.....Mic Sherwood**

**Hydrometeorological Technician.....Hans Hanson**